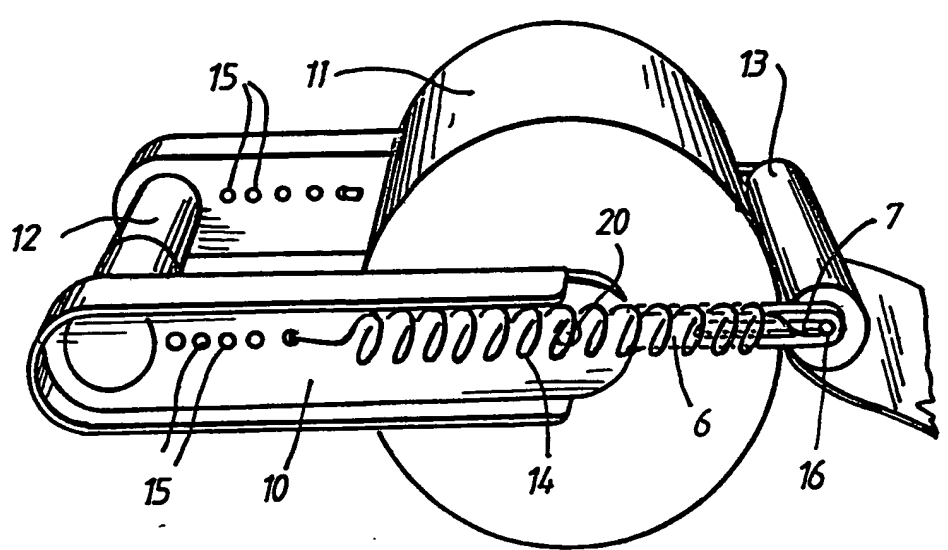




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(54) Title: FILM DISPENSER  (57) Abstract <p>A film dispenser comprises a holder for a roll (11) of packaging material. The holder is carried by a support (10) which includes a handle (12). A brake roller (13) is carried by the support (10) and engages the peripheral surface of the roll (11). Biasing springs (14) bias the roll (11) and brake roller (13) together whereby a braking force is established on the roll (11) restricting rotation thereof and facilitating stretching of the packaging material when it is withdrawn from the roll (11) and around the brake rollers (13).</p>		

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FILM DISPENSERField of the Invention

This invention relates to packaging and more particularly to a device to facilitate packaging articles with plastic wrapping material or synthetic plastic binding material.

So-called "stretch-film" - usually a synthetic plastics material such as linear polyethylene having inherent "cling" properties - has been used for the wrapping or packaging of many types of articles, such as pallet-borne articles including bricks, glass containers, packs of beverages such as beer, and of bulky and/or heavy products such as large rolls of newsprint, kraft paper and the like. The stretch film binds the articles together as a single unit to facilitate their handling and transport. Special machines have been developed to "stretch-wrap" such groups of articles.

Background of the Invention

In many cases it may be desired to package together, as for despatch or marketing, pluralities of like or dissimilar articles, either with or without a pallet. For example, in such fields as food distribution, hardware supplies, etc., it may be desirable to package together several articles to be sold together as a unit.

Heretofore, in such applications, a number of articles, which may be separate, or individually packaged in cartons or boxes, may be packaged together with cellulose tape, bands, cord, lashing, metal or plastic strapping, or the like binding materials.

Such packaging methods are time-consuming and labour intensive and, therefore, relatively expensive.

Background Art

Several forms of machine have been proposed to assist in the wrapping of articles with a stretch film. Australian Patent No. 511,642 discloses an automatic wrapping machine for wrapping layers of film web around a load. With this machine, a turntable holds the load in position and rotates relative to a supported roll of

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stretchable film. A brake is applied to the roll to place tension on the film web so as to stretch the web as it is applied to the rotating load.

5 This machine is designed for relatively large loads and is, consequently, relatively expensive to manufacture.

Australian Patent No. 519,456 discloses a process using a similar type of wrapping machine, while Australian Patent No. 505,121 discloses another form of apparatus
10 for wrapping a plurality of loads into a unitized load. Similarly, United States Patent Nos. 4,050,221, 4,271,657 and 4,432,185 all disclose other forms of stretch wrapping machines for wrapping a plurality of packages into a unit or wrapping palletized loads.

15 The use of such machines requires that the loads be transported to the machine, loaded thereon, clamped or supported in some way while the machine wraps the stretchable film about the load. United States Patent No. 4,102,513 discloses a portable, hand-held dispenser
20 for wrapping a roll of plastic stretch film about an object. The dispenser has a reel assembly on which is mounted the roll of stretchable film. Two handles are connected to the reel assembly for support thereof during use. The support assembly includes a support shaft secured
25 to a base plate and carrying a pair of opposed rotary end supports mounted for rotation on the shaft. The supports engage into the ends of a roll of plastic stretch film. At least one of the supports has a friction brake member operable to act as a brake and restrict rotation
30 of the roll of stretch film on the support shaft. One of the hand grips is operatively associated with the rotary end supports to increase or decrease the drag on the roll and to thereby vary the tension on the film during wrapping. This dispenser, however, requires two hands
35 for operation thereof and requires the braking on the roll of film to be controlled by the operator during use.

European Patent No. 0 081 328 dated November 26, 1982 discloses another form of film dispenser in which

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the film passes around a pair of rollers which are mounted pivotally relative to the film roll. Tension applied to the film causes one of the rollers to be pressed against the surface of the roll of film, and the rollers are geared together so that one roller rotates at a greater speed than the other to thereby stretch the film longitudinally between the rollers. The dispenser has a wheeled base for movement around a palletted load. While this dispenser is portable, it requires to be rolled along a floor around a palletted load, and a handle is provided at the upper end to facilitate such movement. Further, the stretch of the film is controlled by the difference between the peripheral speeds of the two rollers. As soon as tension on the film is diminished, the forces holding one of the rollers against the surface of the film roll also diminishes thus permitting the roll unrestricted movement and diminishing the stretch between the rollers.

It is therefore desirable to provide an improved device for packaging objects which avoids at least some of the previous packaging problems.

It is also desirable to provide a packaging device which facilitates the use of a plastics film, preferably linear, low-density polyethylene film as a packaging material.

It is an object of the invention to provide a portable film dispenser which can be operated with one hand and which allows the user to stretch wrap an article or a group of articles.

A further object of the invention is to provide a film dispenser which is of relatively simple construction, of relatively few moving parts and which is relatively easy to use.

It is also an object of the invention to provide a film dispenser in which the stretch of the film applied to an article may be controlled as desired.

Summary of the Invention

According to one aspect of the present invention there is provided a device for dispensing a packaging

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medium comprising holder means to hold a roll of the packaging medium such that the roll is able to rotate, brake means applied to the roll of the packaging medium, and support means for the holder means to enable the medium
5 to either be applied to articles or to be withdrawn from the roll, said brake means including at least one roller means engaged with a surface of the roll of the packaging medium and biasing means to bias the said roll and at least one roller together.

10 In one preferred form the holder means comprises opposed journals adapted to engage opposite ends of a hollow core of the roll of plastic medium. In another form, the holder means comprises a mandrel which may be fixed relative to the support means, in which case the
15 roll of plastic material will rotate relative thereto, or may be journaled for rotation relative to the support means.

In a preferred aspect there is provided a device for dispensing a packaging medium of stretchable, synthetic
20 plastic material from a roll thereof comprising holder means to carry the roll for relative rotation, support means associated with the holder means whereby the device can be hand-held, wall-mounted or otherwise disposed for use, and brake means including a braking roller carried
25 by the support means, at least one of the roll and braking roller being biased towards the other so that the braking roller engages a surface of the roll to restrict rotational movement thereof.

30 Preferably, the support means comprises at least one handle attached to or integral with the holder means. In an alternative embodiment, the support means includes a base adapted to be secured to a wall, bench, table or other surface.

35 The braking roller preferably is mounted to engage the surface of the roll of plastic material and biasing springs apply a pressure between the roller and the roll to impart a retarding force to the roll to restrict rotation thereof. Thus, when the plastics material is drawn

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from the roll the braking roller restricts rotation of the roll which causes the material to be tensioned and therefore stretched. The degree of tension, and therefore stretch, may be adjustable by adjusting the spring tension.

5 In one form, the springs are attached to cam levers mounted on the support means which are movable to increase or decrease the spring tension and therefore vary the pressure applied by the braking roller to the roll of plastics material.

10 Other means may be used to vary the biasing force and to ensure a substantially constant force is applied irrespective of the diameter of the roll.

In one form of the invention, the device is provided with an eye, or runner, spaced from the roll and the brake means. By passing the plastics material from the roll through the eye or runner, the material is formed into a strand, similar to a cord or the like. In another form, the plastics material is passed through a folding or banding device to form the relatively thin material into a band suitable for banding or tying articles together.

20 In preferred embodiments of the invention the device includes cutting means usable to cut the plastics material when drawn from the roll. In one form, the cutting means comprises a blade mounted on the support means. In another form, the cutting means comprises a cutter movable coaxially relative to the roll and engageable with the plastics material adjacent the brake means. In a further embodiment, the cutter means comprises a blade, preferably serrated, extending substantially parallel to the roll surface but spaced therefrom and engageable by plastics material drawn from the roll.

30 In use of the device of the invention, an end of the plastic stretch-wrap material on the roll, which is mounted for rotation on the holder means, is applied to articles to be wrapped and is held in position while the device and articles are moved apart. The movement causes the plastics material to stretch while simulta-

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neously being wrapped about the article. When the tension in the film reaches a predetermined minimum, sufficient force is exerted to stretch the film and, at the same time, to overcome the effect of the braking means to draw
5 film from the roll.

A linear polyethylene film can be stretched to several times its original length, depending upon its application. Because of inherent elasticity of some types of film, a stretched film may tend to return to its
10 unstretched size or state thereby exerting a pressure on goods or articles wrapped in the film to firmly hold the goods together.

According to another aspect of the present invention, there is provided a film dispenser comprising
15 a housing, handle means for the housing, a pair of opposed guideways in the housing to support opposed ends of a core tube on which is mounted a roll of packaging material, the roll being rotatable relative to the housing, biasing means acting on the core tube to bias it towards the front
20 of the housing, and a brake roller rotatably mounted in the housing and engageable by the roll of packing material.

If desired, the dispenser may be designed as a wall-mounted stretch-film dispenser having the same features as outlined above.

25 In order that the invention is readily understood, hereinafter will be described certain embodiments thereof, by way of example only and with reference to the accompanying drawings.

Description of the Drawings

30 Figure 1 is a side-on schematic perspective of a first embodiment of the present invention;

Figure 2 shows a preferred form of mandrel;

Figure 3 is a top plan view of a second embodiment;

35 Figure 4 is a sectional top plan view of a further embodiment,

Figure 5 is a perspective view illustrating a further embodiment of the invention;

Figure 6 is a top plan view, partly cut away,

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of the dispenser of Figure 5;

Figure 7 is a sectional view taken along the lines 7-7 of Figure 6; and

Figure 8 illustrates a modified construction of
5 braking roller.

Description of the Preferred Embodiments

Figure 1 shows a stretch-film dispenser able to be operated single-handedly. The device of this embodiment comprises a mandrel 8 - later to be described with
10 reference to Figure 2 - which is journaled for rotation within a frame 10. The mandrel is such that it is able to be passed through the hollow core of a roll 11 of stretch-film.

At that end of frame 10 which is remote from the
15 roll 11 and mandrel 8 there is a handle, or hand-grip 12. The dispenser has a braking roller 13, preferably a rough-textured rubber roller, carried by arms 6 and having spindle end 16 slidable in slots 7. The roller 13 is so biased by springs 14 as to be able to maintain
20 a substantially constant braking action force on the roll 11. This braking force is sufficient to permit an adequate degree of stretch of the film of the roll 11 to be attained when the device is put to use. One end of each biasing spring 14 is attached, as in holes 15 in the sides of
25 the frame 10, while the other end is attached to the spindle 16 of braking roller 13. As an alternative, compression spring means could be employed to ensure the required degree of biasing of the braking roller on the roll of stretch film. Ideally, adjustment means are
30 provided for appropriate adjustment of the springs in the various embodiments of the invention, such as the plurality of holes 15.

Referring to Figure 2, this shows a mandrel 8 of telescopic construction. Within a barrel 17 is
35 accommodated an inner member 18 having a head 19 of diameter equal to that of barrel 17. Also within barrel 17, at that end remote from head 19, is a compression spring (not shown) to bias the spigots 20 into co-acting

sockets in frame 10. A detent or stop 21 works in a slot 22 in barrel 17 to prevent inner member 18 from coming out of barrel 17. In use, the mandrel 8 is simply removed from the housing 10 by relative movement of the barrel 17 and inner member 18 to withdraw the spigots 20 from the sockets in the frame 10. Alternatively, the handle 12 may comprise interengaging socket and spigot parts which enable the handle to be dismantled thus providing access to the mandrel 8.

Figure 3 is a top plan view of another embodiment of the present invention. In this embodiment, a mandrel, which may be similar to that shown in Figure 2, or which may be fixed within a frame 23, passes through the hollow core of a roll 11 of stretch-film 24.

The frame 23 has a handle or handgrip 25 and the dispenser is provided with a biased braking roller 26. The braking roller 26 is carried by a wire frame 35 which is held to the frame 23 by a pair of eyes 28. A torsion spring 27 which is integral with the frame 35 applies the biasing force to the braking roller 26.

Referring to Figure 4 there is shown a further embodiment of a hand-held dispenser 31 to dispense plastic film from a roll 32 which is wound onto a core 30, of cardboard or other material. The core 30 is supported on spigots 33 and 34 integral with frame side members 36 and 37 respectively. The frame side member 36 has an integral handle 38 which extends substantially coaxial with the spigots 33 and 34. The handle 38 has an enlarged bulb 39 on its free end which snap-fits into a socket 41 formed in the side member 37 to hold the frame parts together.

A roller 42, preferably of a rubber compound or the like, is carried by springs 43 and 44 to engage the surface of the film roll 32. The springs 43 and 44 are attached to tension adjusting members 46 and 47 respectively located within the frame side members 36 and 37. Each adjusting member has a finger 48, 49 engageable with one of a plurality of seats 51 disposed on a side wall

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of a slot 52 formed in each frame side member 36 and 37.

The frame side member 36 has a cutting blade 53 fixed thereto and protected by a guard 54 which will permit the film to contact the blade 53 while preventing inadvert-
5 ant contact by a user.

The film of plastics material may be formed into a band, cord or "string" for certain applications. For this purpose, the dispenser 31 is provided with an eyelet 56 carried by a wire support 57 or the like so as to be
10 spaced from the roller 42. When the plastic film is passed through the eyelet 56 the constriction of the eyelet together with the tension applied to the film as well as its inherent "cling" property, causes the film to take up the form of a string which is extremely strong.

Referring to Figures 5, 6, 7 and 8, the dispenser of this embodiment comprises a housing 62, moulded of synthetic plastic material and having a front section 63 and a rear section 64 pivoted together about an axis 66. A clip 67 holds the two housing sections in the
15 operable position as shown in Figure 5.

The housing is provided on opposite sides with a pair of guideways 68 which are able to receive the ends of a film roll core or a core tube 69 so as to be movable along the guideways 68 whilst permitting rotation of the
20 roll 11 of the film material.

The rear housing section 64 is formed with an integral handle 71 while the front housing section 63 carries a braking roller 72. The braking roller 72 comprises a spindle 73 mounted in the front section 63,
30 bearing bushes 74 mounted on each end of the spindle 73 and a substantially rigid, PVC roller 76 rotatably mounted on the bearing bushes 74.

A pair of biasing springs 78 are mounted on a journal 79 coaxial with the pivot axis 66. One leg 81, of each spring 78 is supported by a bar 82 in the rear
35 housing section 64 while the other leg 83 of each biasing spring 78 bears against the core tube 69 carried in the guideways 68. The biasing springs 78 thus bias the core

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5 tube 69, and hence the roll 11 towards the braking roller 72. In use, film material passes from the roll 11 between the nip created by the engagement of the roll 11 with the braking roller 72, to be applied to an article or
10 a group of articles to be wrapped with the stretch film material. The braking force applied by the braking roller 72 enables the film to be stretched as it is applied to the articles, the degree of stretch being dependent both on the biasing force and the rotational freedom of the
15 braking roller 72. By passing the stretch film through the nip, the material is always firmly held on the roll 11 and a constant tension is able to be maintained during wrapping.

Referring to Figure 8, the biasing roller 72 may
15 have an inbuilt clutch mechanism which is adjustable to vary the rotational freedom of the braking roller 72, in use. The structure illustrated in Figure 8 comprises a pair of flanges 86 and 87 adapted to engage the ends of the braking roller 72. The flanges 86 and 87 are held
20 together by a spring 88 and a screwed spindle 89 connected to a handle 91. By adjusting the axial position of the spindle 89, by threaded movement of the handle 91 and spindle 89, the tension in the spring 88 can be varied to thereby vary the pressure applied by the flanges 86
25 and 87 on the ends of the braking roller, thereby varying the rotational freedom thereof.

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Claims.

1. A dispenser for dispensing a packaging medium from a roll thereof comprising holder means to hold the roll of the packaging medium such that the roll is able to rotate, brake means applied to the roll, and support means for the holder means to enable the packaging medium to be withdrawn from the roll, said brake means including at least one roller means engaged with a surface of the roll of packaging medium and biasing means biasing the said one roller means and the roll together.
 2. A dispenser according to claim 1 wherein said holder means comprises a mandrel rotatably carried by the support means.
 3. A dispenser according to claim 1 wherein said holder means comprises opposed journals which engage and rotatably support opposite ends of a core of the roll of packaging medium.
 4. A dispenser according to any one of claims 1 to 3 wherein said support means includes a handle which extends substantially parallel to the axis of the said roll.
 5. A dispenser means according to any one of the preceding claims wherein said roller means comprises a cylindrical roller mounted on the support means, and said biasing means comprises one or more springs acting on either the roll or the brake roller whereby the peripheral surfaces of the roller and roll engage.
 6. A dispenser according 5 wherein when withdrawn from the roll, the packaging medium passes around the brake roller after passing through the nip of the roller and roll.
 7. A dispenser according to any one of the preceding claims, wherein the roller means includes an integral clutching means which controls the retarding forces on the brake means.
 8. A dispenser according to claim 7 wherein the clutching means is adjustable.
 9. A dispenser according to any one of the preceding
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claims wherein the roller means is carried on a pair of arms extending from the support means, the arms having slots through which the ends of the roller means pass for slidable movement therealong, and the biasing means comprises a pair of springs extending from the support means and engaged with the roller ends.

10. A dispenser according to any one of the preceding claims wherein said support means comprises a housing and the holder means comprises guideways formed in the housing.

11. A dispenser according to claim 10 wherein the brake roller means is rotatably mounted in the housing and the roll of packaging medium is carried on a core tube rotatably supported in the guideways.

12. A dispenser according to claim 11 wherein said biasing means comprises a pair of spring members with opposed legs, one leg of each being supported by the housing while the other leg is engaged with an end of the core tube to bias the roll towards the brake roller.

13. A dispenser according to any one of claims 10 to 12 wherein the housing is formed of two sections pivoted together and movable between an open position, in which the roll of packaging medium is accessible, and a closed position.

14. A dispenser according to any one of the preceding claims wherein the biasing means is adjustable.

15. A film dispenser comprising a housing, handle means for the housing, a pair of opposed guideways in the housing to support opposed ends of a core tube on which is mounted a roll of packaging material, the roll being rotatable relative to the housing, biasing means acting on the core tube to bias it towards the front of the housing, and a brake roller rotatably mounted in the housing and engageable by the roll of packaging material.

16. A dispenser according to claim 15 wherein said brake roller has integral, adjustable clutch means restricting rotation of the roller.

17. A dispenser according to claim 16, wherein the

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clutch means includes at least one end flange which frictionally engages an end of the brake roller, and biasing means biasing the flange against that end.

18. A dispenser according to claim 17 wherein a pair of flanges engage opposite ends of the brake roller.

19. A dispenser according to claim 1 wherein the packaging medium is stretchable, synthetic plastic film.

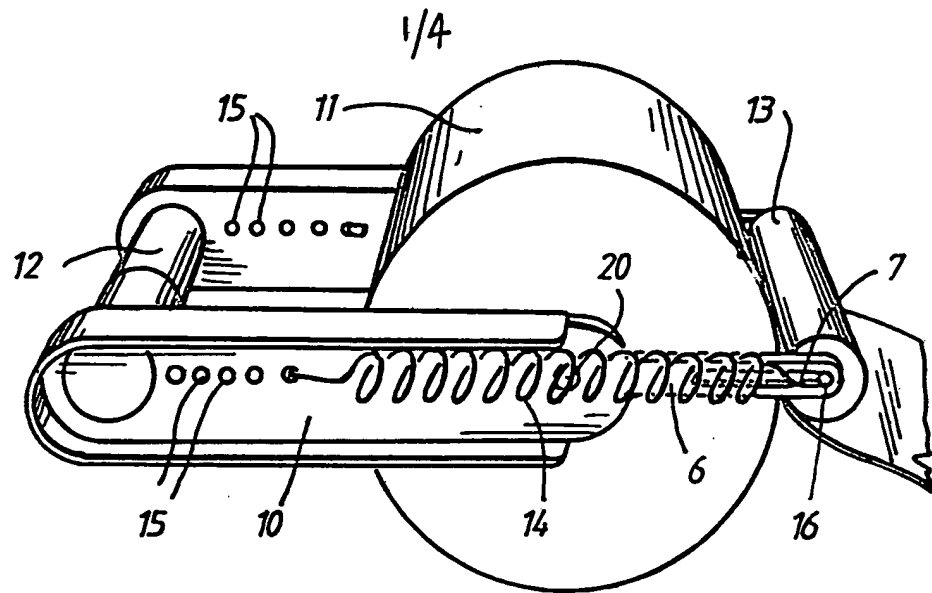


FIG. 1.

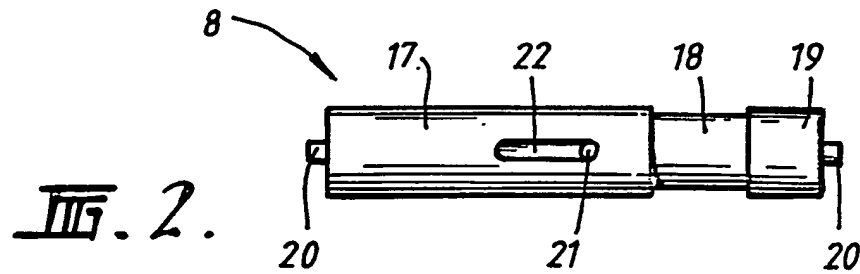


FIG. 2.

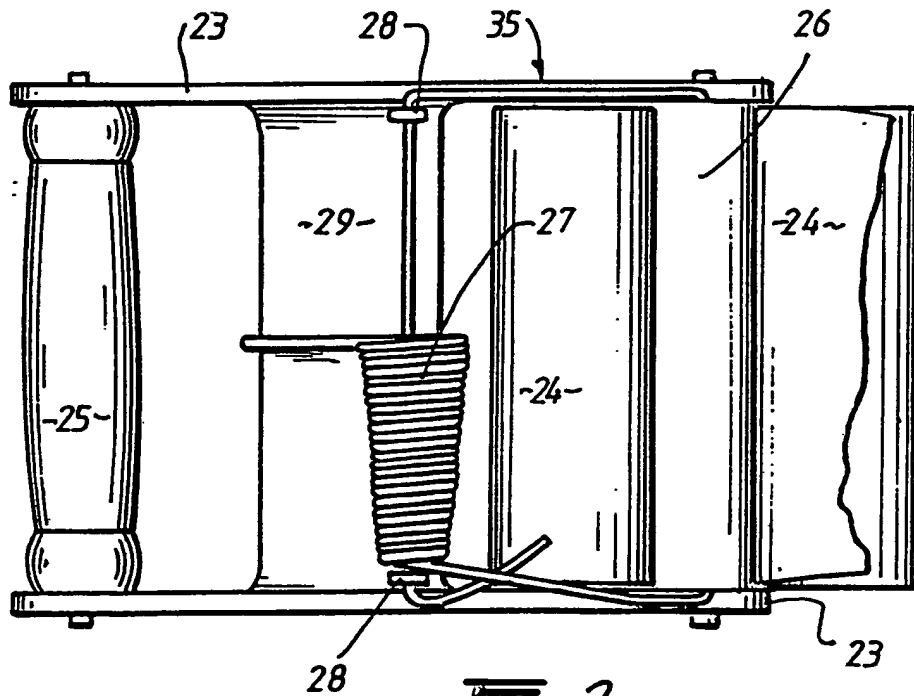


FIG. 3.

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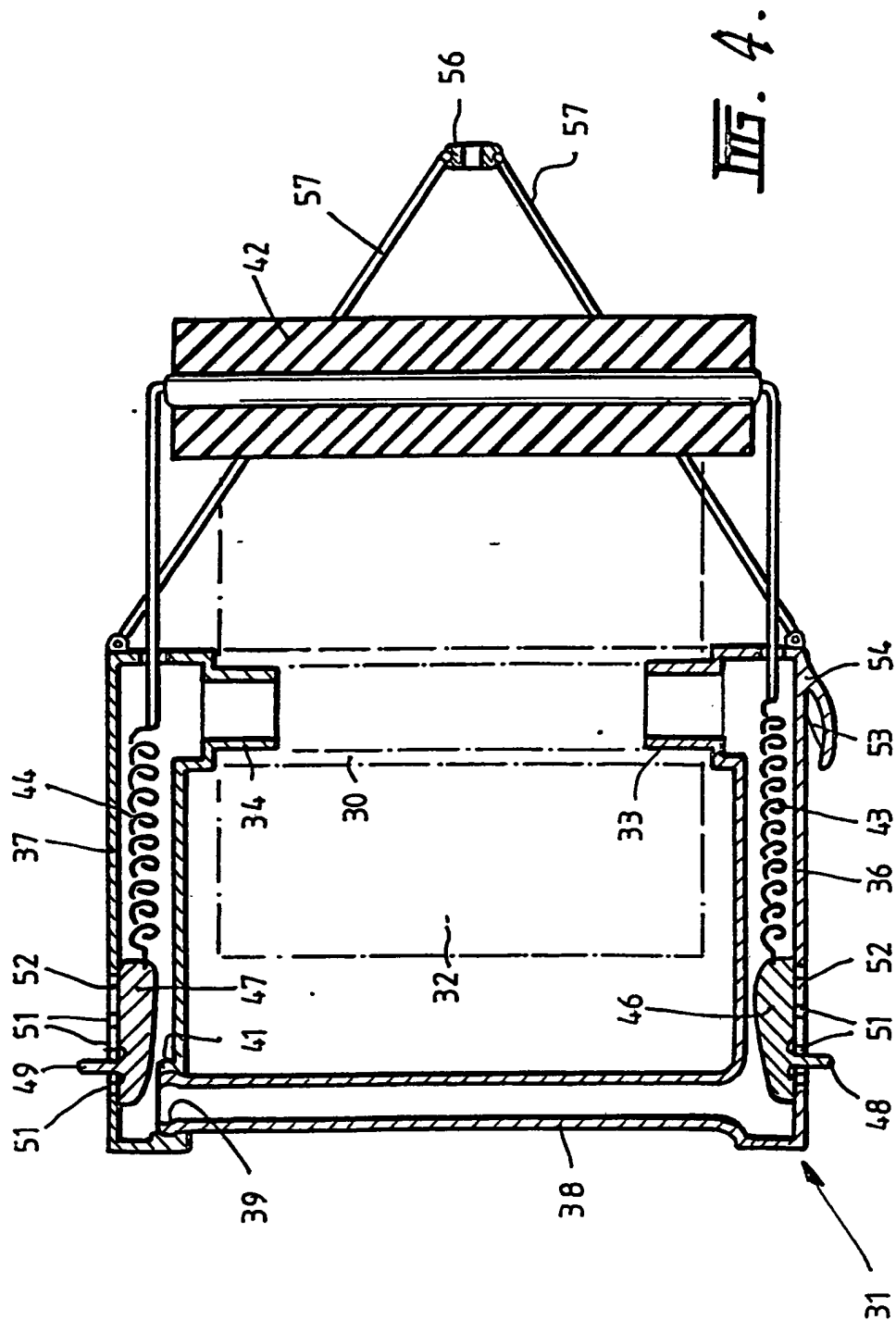


Fig. 4.

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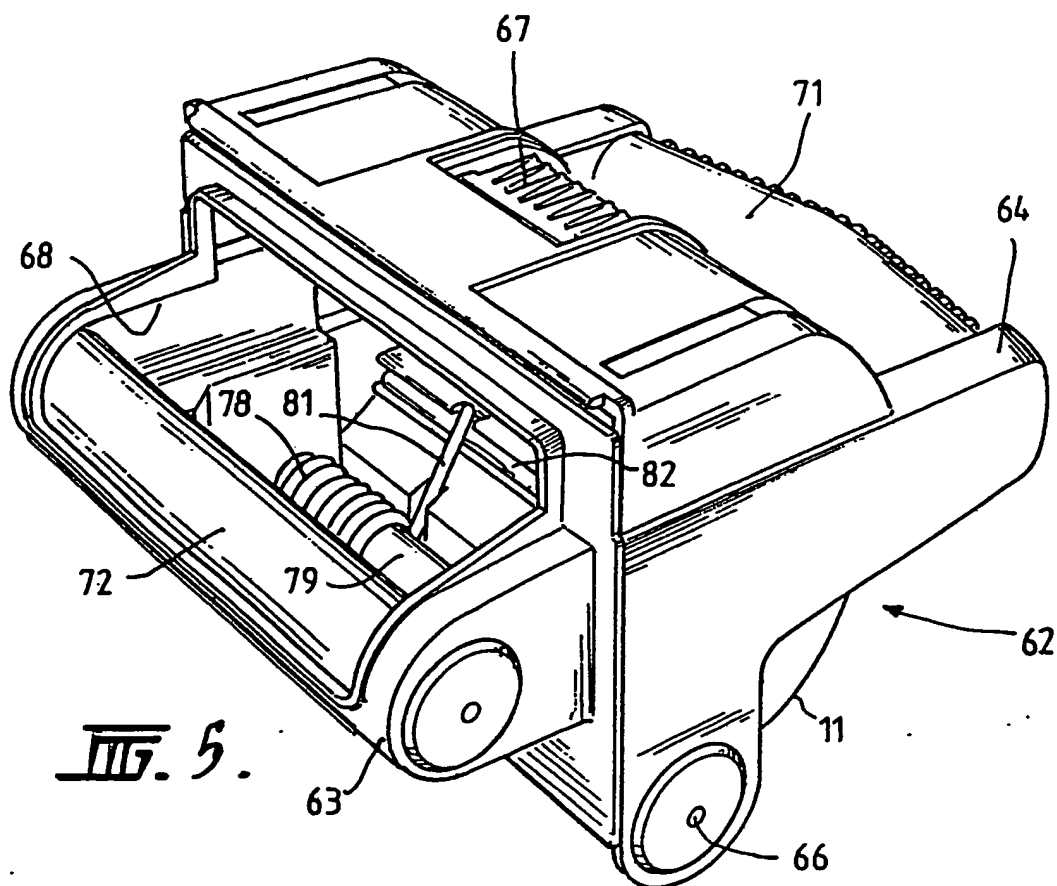


Fig. 5.

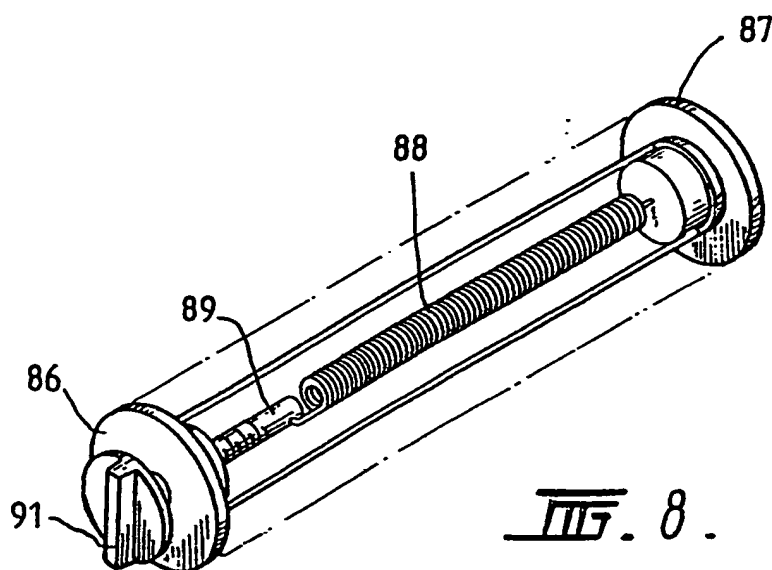
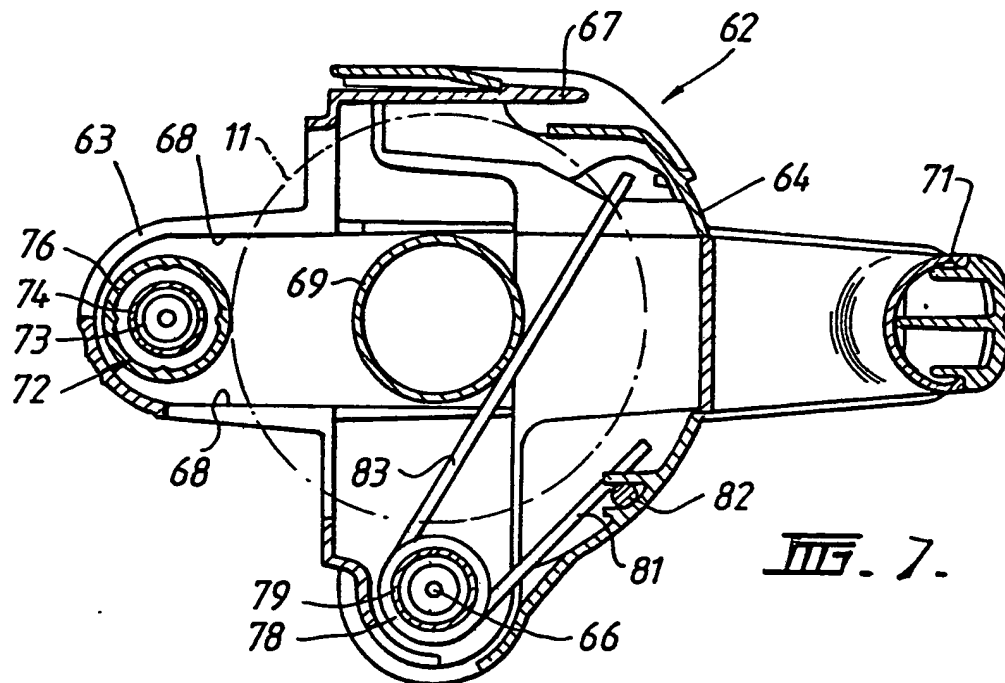
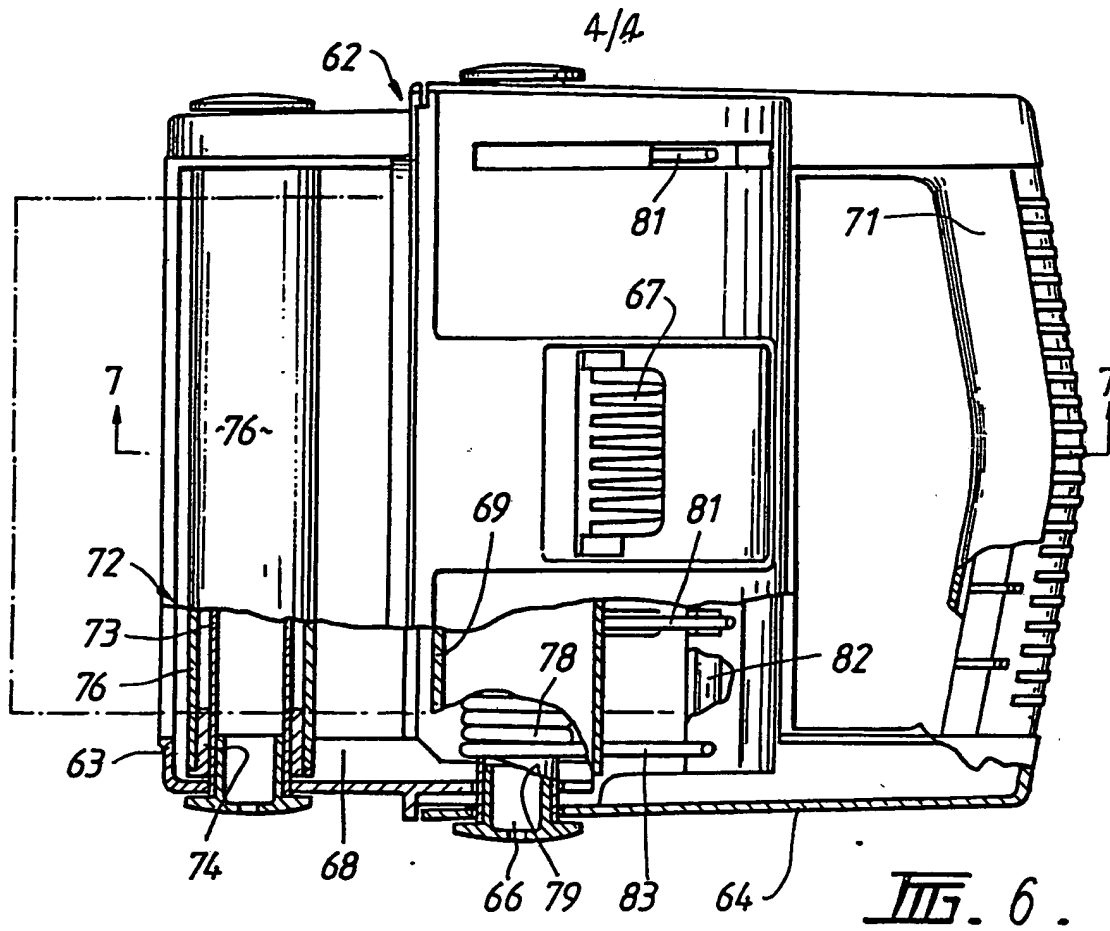


Fig. 8.



INTERNATIONAL SEARCH REPORT

International Application No PCT/AU 88/00276

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ^a According to International Patent Classification (IPC) or to both National Classification and IPC <div style="text-align: center; font-size: 1.2em;">Int. Cl.⁴ B65H 23/16, 23/26, 23/08</div>																																						
II. FIELDS SEARCHED <div style="text-align: center; font-size: 0.8em;">Minimum Documentation Searched^b</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; padding: 5px;">Classification System</td> <td style="padding: 5px;">Classification Symbols</td> </tr> <tr> <td style="text-align: center; padding: 5px;">IPC</td> <td style="padding: 5px;">B65H 23/16, 23/26, 23/08</td> </tr> </table>			Classification System	Classification Symbols	IPC	B65H 23/16, 23/26, 23/08																																
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Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ^c <div style="text-align: center; padding: 10px; font-size: 1.1em;">AU : IPC as above</div>																																						
III. DOCUMENTS CONSIDERED TO BE RELEVANT^d <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; padding: 5px;">Category^e</th> <th style="width: 60%; padding: 5px;">Citation of Document, ^{ff} with indication, where appropriate, of the relevant passages ^{gg}</th> <th style="width: 30%; padding: 5px;">Relevant to Claim No. ^{hh}</th> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">US,A, 3477656 (MULLER) 11 November 1969 (11.11.69)</td> <td style="vertical-align: top; padding: 5px;">(1-6,9-12, 14,15,19)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">EP,A, 170768 (HUDIG & ROCHOLZ GmbH) 12 February 1986 (12.02.86)</td> <td style="vertical-align: top; padding: 5px;">(1-6,9-12, 14,15,19)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">WO,A, 82/00796 (POOL) 18 March 1982 (18.03.82)</td> <td style="vertical-align: top; padding: 5px;">(1,2,19) (1-6,9-12,14)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;"></td> <td style="vertical-align: top; padding: 5px;"></td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">DE,A, 2204854 (KASPER) 9 August 1973 (09.08.73)</td> <td style="vertical-align: top; padding: 5px;">(1,2,5,19)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US,A, 3602448 (MUENSTERER) 31 August 1971 (31.08.71)</td> <td style="vertical-align: top; padding: 5px;">(1,14,19)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US,A, 2596428 (O'MALLEY) 13 May 1952 (13.05.52)</td> <td style="vertical-align: top; padding: 5px;">(1,2,5,14,19)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">Patents Abstracts of Japan, M 572, page 34</td> <td style="vertical-align: top; padding: 5px;">(1,2,5,9,19)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">JP,A, 61-238642 (HITACHI LTD) 23 October 1986 (23.10.86)</td> <td style="vertical-align: top; padding: 5px;">(1-6,10-12,14, 15)</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">Patent Abstracts of Japan, M 174, page 32 JP,A, 57-137253 (TOKYO SHIBAURA DENKI K.K.) 24 August 1982 (24.08.82)</td> <td style="vertical-align: top; padding: 5px;">(1,2,5,19)</td> </tr> <tr> <td colspan="2" style="text-align: right; padding: 10px;">(continued)</td> <td></td> </tr> </table>			Category ^e	Citation of Document, ^{ff} with indication, where appropriate, of the relevant passages ^{gg}	Relevant to Claim No. ^{hh}	Y	US,A, 3477656 (MULLER) 11 November 1969 (11.11.69)	(1-6,9-12, 14,15,19)	Y	EP,A, 170768 (HUDIG & ROCHOLZ GmbH) 12 February 1986 (12.02.86)	(1-6,9-12, 14,15,19)	X	WO,A, 82/00796 (POOL) 18 March 1982 (18.03.82)	(1,2,19) (1-6,9-12,14)	Y			X	DE,A, 2204854 (KASPER) 9 August 1973 (09.08.73)	(1,2,5,19)	X	US,A, 3602448 (MUENSTERER) 31 August 1971 (31.08.71)	(1,14,19)	X	US,A, 2596428 (O'MALLEY) 13 May 1952 (13.05.52)	(1,2,5,14,19)	X	Patents Abstracts of Japan, M 572, page 34	(1,2,5,9,19)	Y	JP,A, 61-238642 (HITACHI LTD) 23 October 1986 (23.10.86)	(1-6,10-12,14, 15)	X	Patent Abstracts of Japan, M 174, page 32 JP,A, 57-137253 (TOKYO SHIBAURA DENKI K.K.) 24 August 1982 (24.08.82)	(1,2,5,19)	(continued)		
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<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>^a Special categories of cited documents: ⁱⁱ</p> <p>^{"A"} document defining the general state of the art which is not considered to be of particular relevance</p> <p>^{"E"} earlier document but published on or after the international filing date</p> <p>^{"L"} document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>^{"O"} document referring to an oral disclosure, use, exhibition or other means</p> <p>^{"P"} document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 50%;"> <p>^{"T"} later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>^{"X"} document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>^{"Y"} document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>^{"A"} document member of the same patent family</p> </div> </div>																																						
IV. CERTIFICATION <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Date of the Actual Completion of the International Search <div style="text-align: center; font-size: 1.1em;">19 October 1988 (19.10.88)</div> </td> <td style="width: 50%; padding: 5px;"> Date of Mailing of this International Search Report <div style="text-align: center; font-size: 1.1em;">27 OCTOBER 1988 (27.10.88)</div> </td> </tr> <tr> <td style="padding: 5px;"> International Searching Authority <div style="text-align: center; font-size: 1.1em;">Australian Patent Office</div> </td> <td style="padding: 5px;"> Signature of Authorized Officer <div style="text-align: center;"> D.G. FRY </div> </td> </tr> </table>			Date of the Actual Completion of the International Search <div style="text-align: center; font-size: 1.1em;">19 October 1988 (19.10.88)</div>	Date of Mailing of this International Search Report <div style="text-align: center; font-size: 1.1em;">27 OCTOBER 1988 (27.10.88)</div>	International Searching Authority <div style="text-align: center; font-size: 1.1em;">Australian Patent Office</div>	Signature of Authorized Officer <div style="text-align: center;"> D.G. FRY </div>																																
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FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

X	Patents Abstracts of Japan, M 459, page 17 JP,A, 60-204560 (SATOO K.K.) 16 October 1985 (16.10.85)	(1,2,5,19)
Y	GB,A, 2055345 (PERFARAP LTD) 4 March 1981 (04.03.81)	(1-6,9-12,14, 15,19)

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE *

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers _____ because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim numbers _____ because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim numbers _____ because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING *

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON
INTERNATIONAL APPLICATION NO. PCT/AU 88/00276

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document
Cited in Search
Report

Patent Family Members

WO 8200796

AU 75828/81
US 4379019

EP 59211
US 4667891

IT 1142735

END OF ANNEX